

Radiation

Safety

Committee

Minutes of Sub-Radiation Safety Committee of April 2, 2001

The improved cross-interlock for RHIC operations

Present: D. Beavis, A. Etkin, J.W. Glenn, and A. Stevens

The subcommittee resolved several issues related to high intensity proton operations while RHIC requests low intensity beams (low intensity protons or ions). There were several issues unresolved from the meeting of Dec. 5, 2000 in which the basic logic was defined (see attachment to Dec. 5, 2000 minutes).

J.W. Glenn and A.J. Stevens reviewed the fault studies under Thompson road (see attachment 1). The detected fault levels were compared to values obtained during the RHIC berm fault studies. **They recommend that a value of 1.5 microrem per 10^8 Au ions or 10^{10} protons be used as a basis for the protection against faults in this area.** This sub-committee accepted the use of this value for estimating fault conditions under Thompson Road.

This year the Thompson Road area is enclosed in a fence and will be posted as a controlled area.

There are several relevant dose level thresholds for either total dose or dose in an hour. Table I has a listing of these dose thresholds and the corresponding number of lost Au ions or protons required to produce them.

Dose	Au ions	Protons
5 mrem	$3.3 \cdot 10^{11}$	$3.3 \cdot 10^{13}$
100 mrem	$6.7 \cdot 10^{12}$	$6.7 \cdot 10^{14}$
5000 mrem	$3.3 \cdot 10^{14}$	$3.3 \cdot 10^{16}$
50000 mrem	$3.3 \cdot 10^{15}$	$3.3 \cdot 10^{17}$

Dual independent interlocks are required for levels exceeding 50 rem/hr. Based on the fault studies dual interlocks are not required for even the most non-credible fault.

The present sub-committee approved using the off status of both the 8 degree-bend and the 20 degree bend to prevent high intensity proton beam from being transported into AtR. This exceeds requirements. This can be reconsidered if there are operational difficulties.

The interlocks will allow these bends on if either one of two conditions are met. First, if Booster injection by the Linac is off; this defines the heavy ion mode and the bends are allowed on. At present only Au ions are allowed to be delivered to RHIC (see Aug. 24, 2000 minutes). The second allowed condition is a closed valve which prevents the high intensity source from delivering beam into the RFQ and the Linac. This is allowed to be a single hardwired interlock. This will define the high intensity proton source off. Other conditions/restrictions are required for the low intensity (polarized proton) source and are defined below.

Operations procedures shall limit the fault in an hour to less than 1.7×10^{11} Au ions or 1.7×10^{13} protons. This limit corresponds to a dose rate of 2.5 mrem/hr. **(CK-RHIC_FY2001-238)**

The AGS must be prevented from accelerating more than 6.7×10^{14} polarized protons per hour. This limit must be accomplished by well-controlled hardware and documented to the RSC. **(CK-RHIC-FY2001-239)**

Each arc has two chipmunks located close to Thompson Road. These chipmunks prevent large faults in the early sections of the injection arcs where they are more likely to occur. These were placed when this area was uncontrolled. The area is now controlled and Thompson Road will be closed to vehicles. If necessary, it may be possible to reduce the number of chipmunks, but for now it was decided to leave the present configuration unchanged.

It was suggested that a method to monitor for faults under the berm near Railroad Ave. be considered. This is presently not required. A. Stevens will sign the start-up check-off sheet that it is being considered as an upgrade this year. **(CK-RHIC-FY2001-240)**

Attachments

1) memo J.W. Glenn and A.J. Stevens to D. Beavis on Dec. 12, 2000